

Lateral-Directional Active Flow Control on a Hybrid ICE-101/Saccon UCAV

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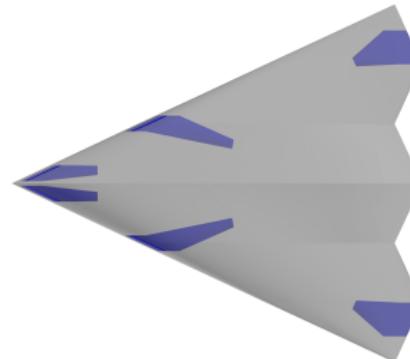
1 Simulations

- Setup
- Results

CFD description

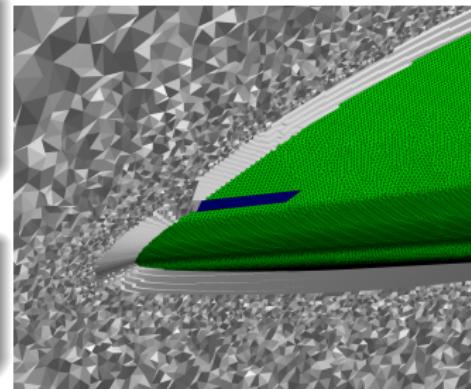
CFD code

- HPCMP CREATE-AV™ / *Kestrel*
- Cell-centered finite volume
- Compressible Navier-Stokes equations
- 2nd-order in space and time
- SARC turbulence model



Grid

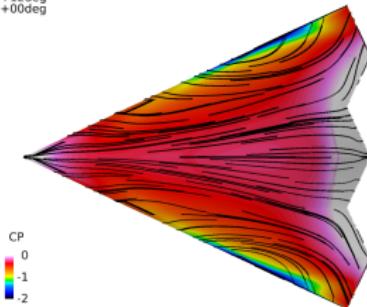
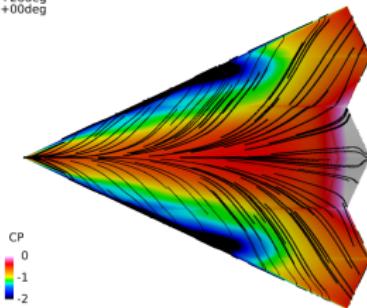
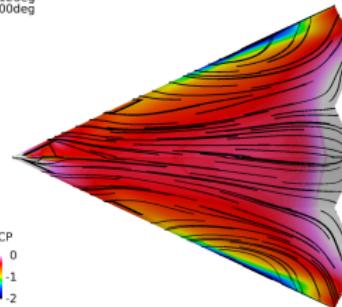
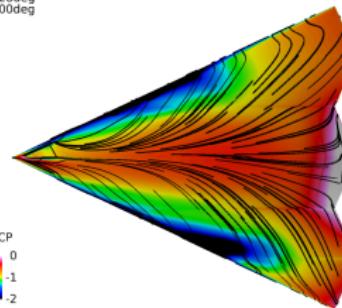
- Geometry with 6 forcing slots
- 71M cells
- $y^+ < 1$



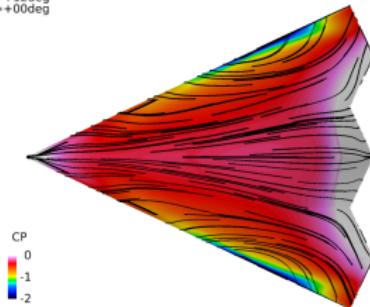
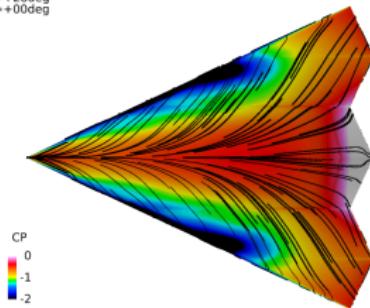
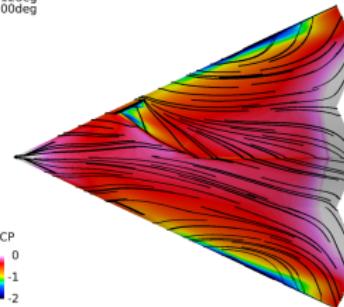
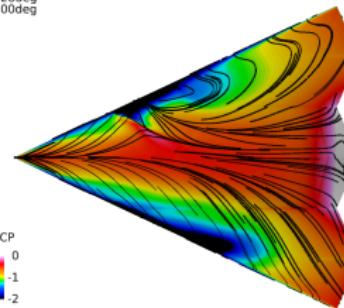
Forcing

- Source boundary condition
- $c_\mu = 0.005$

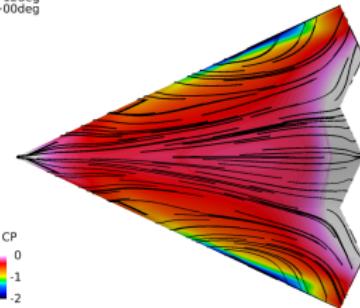
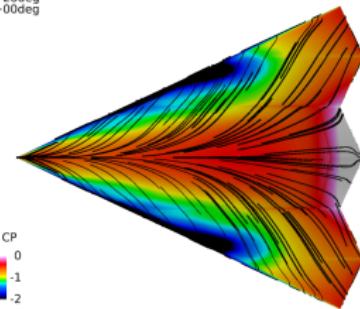
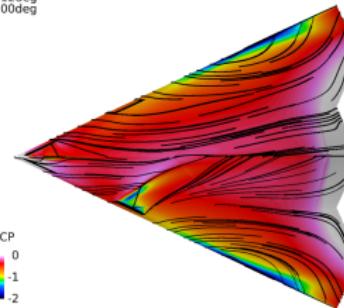
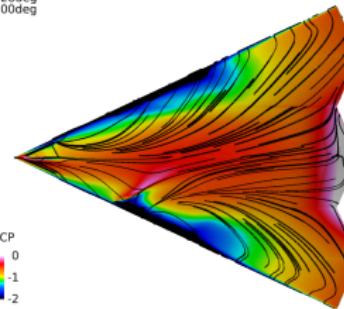
Comparison Unforced - Apex Forcing

Unforced $\alpha = +12\text{deg}$
 $\beta = +00\text{deg}$  $\alpha = +28\text{deg}$
 $\beta = +00\text{deg}$ **Apex Forcing** $\alpha = +12\text{deg}$
 $\beta = +00\text{deg}$  $\alpha = +28\text{deg}$
 $\beta = +00\text{deg}$ 

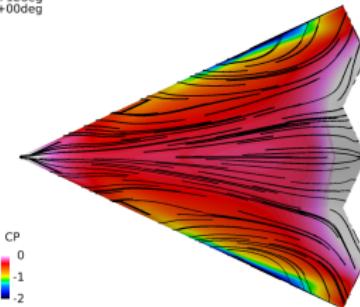
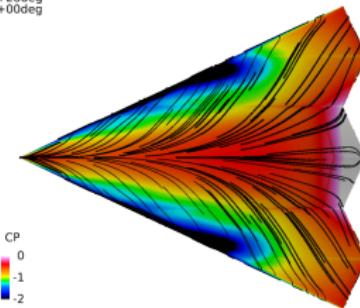
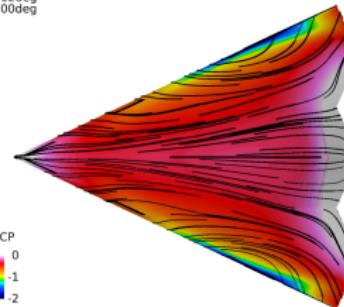
Comparison Unforced - Midspan Forcing

Unforced $\alpha = +12\text{deg}$
 $\beta = +00\text{deg}$  $\alpha = +28\text{deg}$
 $\beta = +00\text{deg}$ **Midspan Forcing** $\alpha = +12\text{deg}$
 $\beta = +00\text{deg}$  $\alpha = +28\text{deg}$
 $\beta = +00\text{deg}$ 

Comparison Unforced - Combined Forcing

Unforced $\alpha = +12\text{deg}$
 $\beta = +00\text{deg}$  $\alpha = +28\text{deg}$
 $\beta = +00\text{deg}$ **Combined Forcing** $\alpha = +12\text{deg}$
 $\beta = +00\text{deg}$  $\alpha = +28\text{deg}$
 $\beta = +00\text{deg}$ 

Comparison Unforced - Trailing Edge Forcing

Unforced $\alpha = +12\text{deg}$
 $\beta = +00\text{deg}$  $\alpha = +28\text{deg}$
 $\beta = +00\text{deg}$ **TE Forcing** $\alpha = +12\text{deg}$
 $\beta = +00\text{deg}$  $\alpha = +28\text{deg}$
 $\beta = +00\text{deg}$ 